# THE INTER-RELATIONSHIPS OF CERTAIN JASSOID GENERA (JASSOIDEA, HOMOPTERA)

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As a result of a study of Australian leaf-hoppers which has extended over several years, certain conclusions have been reached concerning the classification of this group of insects that disagree with the generally accepted ideas on the subject. These conclusions have already been published (Evans, 1939). The purpose of the present paper is to draw attention to the new proposed classification in so far as it affects certain genera represented in the North American fauna. It is not intended to repeat the arguments on which the new system is based, nor to give lengthy diagnoses of characters. Instead, recourse is made to brief comparisons supported by illustrations. These it is hoped will suffice to stimulate interest in the new proposals, and help to pave the way to a system based more on genetic affinity than on superficial characteristics.

The genera concerned are, Bythoscopinae: *Bythoscopus* Germ., *Agallia* Curtis, *Idiocerus* Lewis, *Macropsis* Lewis, *Oncopsis* Burm., *Neopsis* Oman; Gyponinae: *Gypona* Germ., *Penthimia* Germ., *Xerophloea* Germ.; Jassinae: *Jassus* Fabr., *Euscelis* Brullé, *Dorycephalus* Kirsch., *Hecalus* Stål, *Spanbergiella* Sign., *Parablocratus* Fieb., *Nionia* Ball; Koebelinae: *Koebelia* Baker.

Following Baker (1923), it has been found convenient to regard each of the more distinct groups of leaf-hoppers as a family unit, and the re-arrangement of the above genera into families on the basis of my system results in the following groupings:

- Bythoscopidae
  - Gyponinae
    - Hecalini — *Hecalus, Parablocratus, Spanbergiella*
    - Gyponini — *Gypona*
  - Bythoscopinae — *Bythoscopus*
  - Penthimiinae
    - Penthimiini — *Penthimia*
    - (Thaumatoscopini*)

*Not represented in North America.

Euscelidae, *Euscelis*. Agalliidae, *Agallia*. Macropsidae, *Macropsis, Oncopsis, Neopsis*. Idioceridae, *Idiocerus*. Jassidae, *Jassus*. Thymbridae, *Nionia*. Ledridae, *Dorycephalus, Xerophloea*. Stenocotidae, *Koebelia*.

Whilst certain of the proposed changes, such as the separation of *Euscelis, Idiocerus* and *Jassus*, have been suggested previously by other workers, others, in particular the association of *Bythoscopus, Hecalus, Penthimia* and *Gypona*, are original, and may at first sight appear absurd. If in time the alterations proposed should become accepted in whole or even in part, it will not be the first occasion on which a

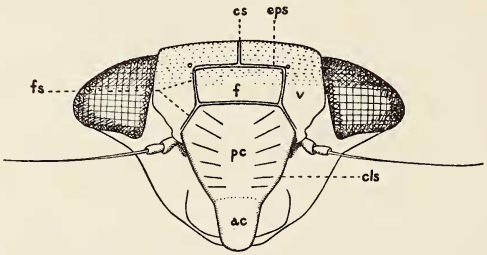


Figure 1. Head of a nymph of *Tartessus* sp. ac., ante-clypeus; pc., post-clypeus; f., frons; cls., clypeal suture; fs., frontal suture; v., vertex; cs., coronal suture; eps., epicranial suture.

knowledge of the Australian representatives of a group of organisms has led to a radical change being effected in the basic classification of the same group in other faunal zones.

The usual arrangement of the various genera into subfamilies on the basis of the position of the ocelli is clearly artificial and several workers have stressed this fact in the past. Nevertheless, whilst the position of the ocelli may be of little significance, the shape and structure of the head as a whole affords the most reliable single diagnostic character. Because certain terms will be used in referring to the head that are not commonly employed, a figure of the head of a nymph of *Tartessus* sp. is given with certain of the sutures and sclerites indicated (Fig. 1). This particular insect has been chosen for illustration as the front is present as a separate sclerite. With the backward migration of the dilator muscles of the sucking pump, the epistomal suture, which separates the clypeus from the frons, disappears;

such a condition is found in all adult leaf-hoppers. The sclerite made up in part of the frons and in part of the post-clypeus, will be referred to as the fronto-clypeus. It may be entirely central in position or extend onto the crown, and may, or may not, be directly continuous with the vertex. The morphology of the head of Homoptera has been fully discussed in three recent publications (Spooner, 1938; Evans, 1938; Snodgrass, 1938.)

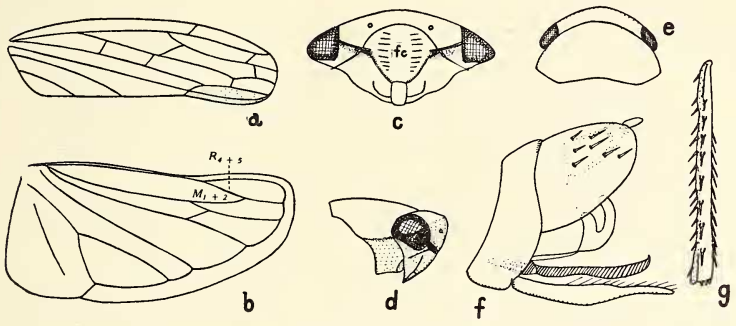


Figure 2. a, b, e, *Eurinoscopus punctatus;* c, d, g, *Bythoscopus lanio*; f, *Eurinoscopus* sp., male genitalia; fr., fronto-clypeus.

## Bythoscopidae

The principal features of the external structure of *Bythoscopus lanio* (L.) and *Eurinoscopus* spp. are shown in Figure 2. *Eurinoscopus* Kirk. is an Australian genus which according to Oman (1936) is synonymous with *Bythoscopus.* In Figure 3 the corresponding parts of *Reuteriella flavescens* Sign. are illustrated. This is an Australian leaf-hopper, which, because of the marginal position of the ocelli, would presumably be placed in the Jassinae by most Hemipterists. It is unnecessary to do more than draw attention to the very close similarity between the two groups of illustrations. The differences are, that in *Bythoscopus,* a frontal and an epicranial, but not a coronal, suture are retained, the reverse being the case with *Reuteriella.* The ocelli in the two genera are in identical positions, as is shown by a comparison of Fig. 2, d with Fig. 3, e, except that the backward extension of the muscles of the sucking-pump and the accompanying

flattening and production of the head have changed their aspect in *Reuteriella.*

The process arising from the ventral internal margin of the pygophore of the male genitalia of *R. flavescens* is secondary, and of only specific value as a diagnostic character. Quite apart from structure, in appearance, habits and coloration, *Reuteriella* spp. and *Eurinoscopus* spp. are very similar.

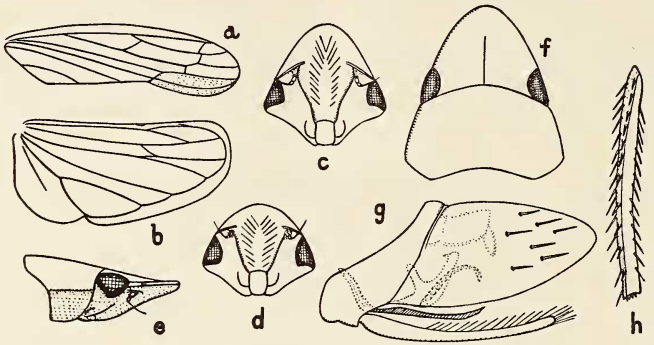


Figure 3. *Reuteriella flavescens;* c, ♀ ; d, ♂.

If it is accepted that *Reuteriella* should be grouped with *Bythoscopus* rather than in the Jassinae, there seems to be no good reason why *Hecalus, Parablocratus* and *Spanbergiella* should not also be placed in the Bythoscopidae. Although species in these genera may lack the character of having $R_{4+5}$ fused apically with $M_{1+2}$ in the wing, all have similarly shaped heads and pronota and flattened hind tibiae with an almost identical armature of spines. Furthermore, the tegminal venation is not basically dissimilar. Figures are given (Fig. 4, d–g) of *Spanbergiella vulnerata* (Uhl.) and *Parablocratus glaucescens* Fabr. (a Tunisian species).

The relationship of *Gypona* to *Bythoscopus* is not quite so apparent, but it is believed that *Krisna strigicollis* (Spin.), which occurs in Borneo (Fig. 5 a–e), is close to *Reuteriella.* A comparison of these figures with Figure 5 $a_1$–$d_1$ suggests that the two genera are not far removed from each other. Moreover, if *Penthimia* is grouped with *Gypona,* as is usually done, then the case for the inclusion of *Gypona* in the Bythoscopidae is strengthened. A comparison of the head of

*Bythoscopus* and *Penthimia,* illustrated in Figures 2, c and 4, b respectively, will show that the genera resemble each other in essential head structure. The occurrence of the hindmost part of the fronto-clypeus on the crown in *Penthimia* is a purely secondary feature brought about by the production and inflation of the fronto-clypeus. The Thaumatoscopini are a tribe comprising Australian genera that show complete gradation between species with ventral ocelli and rounded heads, and others with dorsal ocelli and spatulate heads.

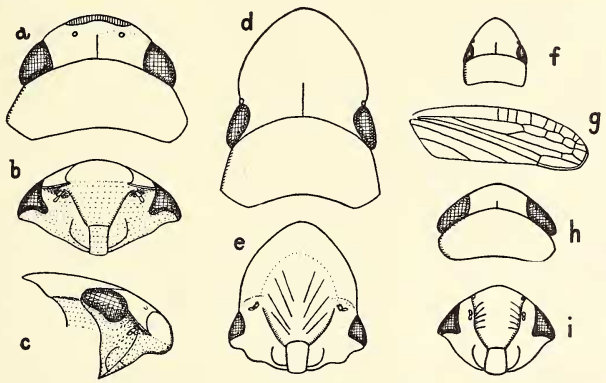


Figure 4. a–c, *Penthimia americana;* d, e, *Spanbergiella vulnerata;* f, g, *Parablocratus glauscens;* h, i, *Thamnotettix cockerelli.*

## Euscelidae

This family, which comprises genera related to *Euscelis,* such as *Thamnotettix* Zett., *Eutettix* Van D. and *Deltocephalus* Burm., though distinct from the Bythoscopidae, is probably an offshoot from it. It is almost certain that *Hecalus, Parablocratus* and *Spanbergiella* are nearer to *Bythoscopus* than to *Euscelis.* For the purpose of comparison, figures are given of *Thamnotettix cockerelli* Ball. (Fig. 4, h, i).

## Agalliidae

*Agallia* does not closely resemble *Bythoscopus* in shape, size, or coloration, nor in a single character of any significance; neither do any of the numerous genera usually asso-

ciated with *Agallia*. For comparison with the illustrations of *Bythoscopus*, figures are given of *Euragallia farculata* (Osb.) (Fig. 6, g–i).

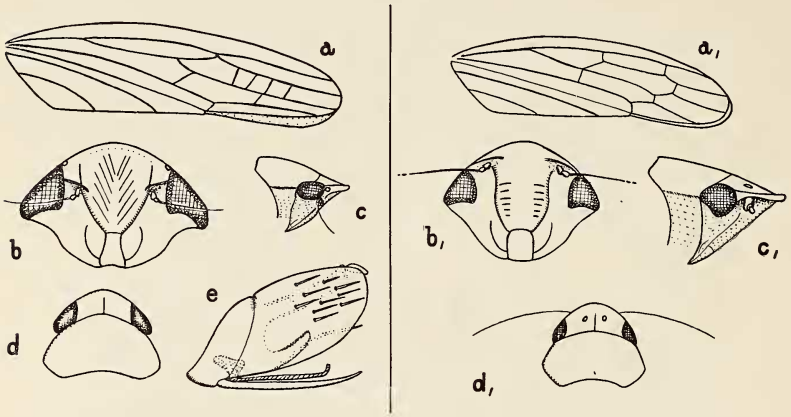


Figure 5. a–e, *Krisna strigicollis;* a, *Gypona scarlatina*, b–d, *Gypona 8-lineata.*

## Macropsidae

*Macropsis* and *Oncopsis* likewise present no essential features in common with *Bythoscopus*. Oman (1936) has suggested that *Neopsis* Oman is intermediate in character between *Macropsis* and *Bythoscopus*. Through the kindness of Mr. Oman I have been able to examine a specimen of the genotype, *N. elegans* Van D., and am of the opinion that without any doubt it should be placed in the Macropsidae, any resemblance it may have to *Bythoscopus* being purely superficial. All the Macropsidae have a character in common that does not occur in representatives of other families. This is, that when the muscle impressions of the sucking-pump are visible on the fronto-clypeus, they are invariably confined with a pair of crescent-shaped markings.

## Idioceridae

In 1936 Oman removed *Idiocerus* and related genera from the Bythoscopinae and referred them to the Eurymelinae. Whilst in agreement with the separation, I do not support

the new combination. The following characters which occur in all the Eurymelidae are not found in *Idiocerus*: in the head the epicranial sutures are invariably retained; in the tegmen the media has always two, and sometimes three, distinct branches; in the male genitalia the aedeagus is not in direct contact with the basal plates. Quite apart from these features, the Eurymelidae differ from the Idioceridae in shape, coloration and habits. Figures of *Idiocerus dolosus* Ball (Fig. 6, d–f), are given for comparison with those of *Bythoscopus*.

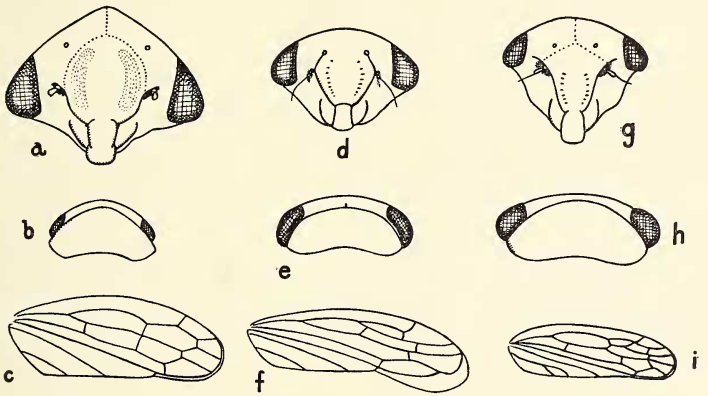


Figure 6. a, *Macropsis tasmaniensis*; b, c, *Oncopsis distinctus;* d–f, *Idiocerus dolosus;* g–i, *Euragallia furculata.*

## Jassidae

Figures are not given of a representative of this family, but there seems no good reason why genera such as *Jassus* Fabr. and *Tharra* Kirk. should be associated with forms such as *Euscelis* and *Thamnotettix*.

## Thymbridae

Oman, in referring to *Nionia* Ball, states that it was correctly placed by Ball as a relative of *Tartessus* Stål, but was more closely related to *Thymbris* Kirk. and *Epipsychidion* Kirk. I have not had an opportunity of examining a specimen of *Nionia,* but, if it is closely related to *Thymbris,* it is

presumably a member of the Thymbridae, which contains several Australian genera and a single New Zealand genus. Thus it cannot be very close to *Tartessus*. The Tartessidae contain a number of genera which now occur in Australia, New Guinea, the Phillipines, New Caledonia and Mysol and which all have certain unique characteristics. One of these is the continuation of the ambient vein of the wing onto the anal area. The tegmen of *Mesojassoides gigantea* Oman from Cretaceous deposits of Colorado figured by Oman (1937), is very similar to that of a present-day *Tartessus*, and suggests that this family had a wider distribution at one time than it has at present.

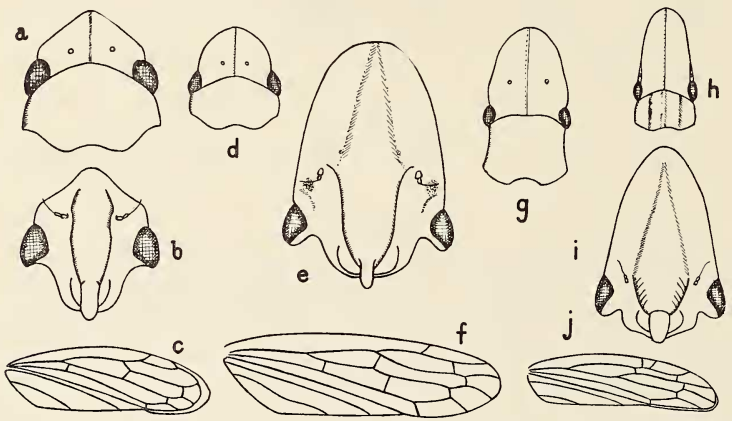


Figure 7. a–c, *Xerophloea viridis;* d, f, *Rubria sanguinea;* e, g, *Ledropsis crocina;* h–j, *Dorycephalus platyrhynchus.*

## Ledridae

*Xerophloea* is usually placed in the Gyponinae because it has dorsal ocelli and is clearly not close to *Cicadella* Latr., *Dorycephalus* having marginal ocelli is placed in the Jassinae. Both genera are much closer to genera in the Ledridae, as may be seen in Figure 7, where figures of the Australian Ledrids *Rubria sanguinea* Stål and *Ledropsis crocina* Dist. are placed beside others of *Xerophloea viridis* (Fabr.) and *Dorycephalus platyrhynchus* Osb.

## Stenocotidae

Baker (1923) considered *Koebelia* to be intermediate between *Ulopa* Fall. and *Paropia* Germ. on the one hand, and *Stenocotis* Stål on the other. For reasons previously given, (Evans, 1939), there would seem to be no justification for placing *Koebelia californica* Baker in a separate family, when it is essentially a Stenocotid.

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